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Beth Pearson-Naul

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | | |
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| Applicants: | Kristopher T. Kohl | § | |
| | | § | Attorney Docket No.: 194-13206-CIP |
| Serial No.: | 09/658,907 | § | |
| | | § | Examiner: R. Krishnamurthy |
| Filing Date: | September 11, 2000 | § | |
| | | § | Group Art No.: 3753 |
| Title: | "Closed Loop Additive Injection and Monitoring System for Oilfield Operations" | § | |



Commissioner of Patents and Trademarks
Washington, DC 20231

## APPEAL BRIEF TRANSMITTAL

Please find enclosed in triplicate, bound Brief for Appellants (37 CFR §1.192) for the above referenced patent application.

The Commissioner is authorized to charge the $320 fee required under 37 CFR §1.17(c) for filing the brief. The Commissioner is also authorized to charge any additional fees or credit any overpayments to Deposit Account **02-0429** (**194-13026-CIP**).

Respectfully submitted,

Date: September 11, 2002



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PATENT

BEFORE THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

| | | |
|---|---|---|
| In re application of: Kristopher T. Kohl | § | Appeal No. _____ |
| U.S. Serial No.: 09/658,907 | § | Group Art Unit: 3753 |
| Filed: September 11, 2000 | § | Examiner: R. Krishnamurthy |
| For: CLOSED LOOP ADDITIVE INJECTION AND MONITORING SYSTEM FOR OILFIELD OPERATIONS | § | Docket No. 194-13026-CIP |
| | § | Date: September 11, 2002 |
| | § | |
| | § | |



## BRIEF FOR APPELLANTS (37 CFR §1.192)

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Appellants hereby submit their brief on appeal from the decision rendered by the Examiner finally rejecting Claims 1-20, in the office action mailed April 11, 2002 (OFFICE ACTION), in furtherance of the Notice of Appeal filed July 11, 2002.

The fees required under 37 CFR §1.17(c), and any required petition for extension of time for filing this brief and fees therefor, are dealt with in the accompanying Transmittal of Appeal Brief.

This Brief is transmitted in triplicate.

The final page of this brief bears the attorney's signature.



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I hereby certify that this Appeal Brief, and associated papers are being deposited with the United States Postal Service Express Mail Post Office for delivery to Addressee as service under 37 CFR §1.10 on the date indicated above and is addressed ATTENTION: Board of Patent Appeals and Interferences, Assistant Commissioner for Patents, Washington, D.C. 20231.

Brad Pearson Dad

9-11-02
Date

# TABLE OF CONTENTS

This Brief contains these items under the following headings, and in the order set forth below (37 CFR §1.192(c)):

## I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Baker Hughes Incorporated.

## II. RELATED APPEALS AND INTERFERENCES

Appellants, their legal representative, and their assignee are unaware of any other appeals or interferences which will directly affect or would be directly affected by or have a bearing on the Board's decision in this pending appeal.

## III. STATUS OF CLAIMS

The claims appealed are Claims 1-20, which were finally rejected in the Office Action mailed April 11, 2002.

## IV. STATUS OF AMENDMENTS AFTER FINAL

There were no amendments requested after the final rejection.

## V. SUMMARY OF THE INVENTION

The claims on appeal are directed to a system for monitoring and controlling a supply of an additive introduced into formation fluid within a production wellbore, in Claims 1-15, and a method of monitoring at a wellsite, the supply of additives to formation fluid recovered through a production wellbore and controlling said supply of additives into the production wellbore from a remote location in Claims 16-20.

## VI. ISSUES

The issues on appeal are:

1. Whether the Examiner has established that Claims 14 and 15 are indefinite under 35 U.S.C. §112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

2. Whether the Examiner has established a case of *prima facie* obviousness under 35 U.S.C. §103(a) of Claims 1, 2, 4 - 8, 10, 14, and 16 – 18 over U.S. Patent No. 4,635,723 to Spivey (SPIVEY) in view of U.S. Patent No. 4,721,158 to Merritt, Jr. et al. (MERRITT) and further in view of U.S. Patent No. 4,345,553 to Hensley (HENSLEY).

3. Whether the Examiner has established a case of *prima facie* obviousness under 35 U.S.C. §103(a) of Claim 9 over the SPIVEY - MERRITT - HENSLEY combination as applied to Claims 1, 2, 4 - 8, 10, 14, and 16 - 18, and further in view of U.S. Patent No. 6,006,832 to Tubel, et al. (TUBEL).

4. Whether the Examiner has established a case of *prima facie* obviousness under 35 U.S.C. §103(a) of Claims 11, 12, 19 and 20 over the SPIVEY - MERRITT - HENSLEY combination as applied to Claims 1, 2, 4 - 8, 10, 14, and 16 - 18, and further in view of U.S. Patent No. 4,665,981 to Hayatdavoudi (HAYATDAVOUDI).

5. Whether the Examiner has established a case of *prima facie* obviousness under 35 U.S.C. §103(a) of Claim 13 over the SPIVEY - MERRITT - HENSLEY combination as applied to Claims 1, 2, 4 - 8, 10, 14, and 16 - 18, and further in view of U.S. Patent No. 4,901,563 to Pearson (PEARSON).

6. Whether the Examiner has established a case of *prima facie* obviousness under 35 U.S.C. §103(a) of Claims 3 and 15 over the SPIVEY - MERRITT - HENSLEY combination as applied to Claims 1, 2, 4 - 8, 10, 14, and 16 - 20, and further in view of PCT Publication No. WO 98/57030 to Johnson et al. (JOHNSON).

## VII. GROUPING OF CLAIMS

The claims on appeal, 1-20, are generally divided into two groups. The first group, Claims 1-15, is to a system for monitoring and controlling the flow of a selected additive to a wellbore. The second group, Claims 16-20, is to a method of monitoring and controlling the flow of a selected additive to a wellbore. Appellants respectfully submit that Claims 1-20 do not stand or fall together, but rather are properly divided into the following groups, by issue.

**In regard to Issue 2**, the Examiner has grouped the claims into a single group consisting of Claims 1, 2, 4-8, 10, 14, and 16-18. It is the Appellants', position that the claims are properly grouped as follows:

**Claims 1-2, 5, 6, 8, 10, and 14**: which claim the system of the present invention generally;

**Claim 4**: to the use of a positive displacement flow meter with the system;

**Claim 7**: to remote programming of the system; and

**Claims 16-18**: to the method of using the system to monitor and control the flow of additives into the production fluid within the production wellbore.

Claims 4 and 7 are patentably distinct from the other system claims in the Issue 2 group and each other because each represents a specific solution to problem not recognized by others and the recognition of that problem is a basis for the patentability of the present invention.

Claims 16-18, as method claims, have step elements that are distinct and different from the hardware necessary to carry them out.

**In regard to Issue 4**, the Examiner has grouped together Claims 11, 12, 19 and 20. Claims 11 and 12 are system claims while Claims 19 and 20 are method claims. Claims 11 and 12 should be grouped separately from Claims 19 and 20 because method claims have step elements that are distinct and different from the hardware necessary to carry them out.

**In regard to Issue 6**, the Examiner has grouped Claims 3 and 15 together. Claims 3 and 15 should be considered separately because Claim 3 is to application of the system of the present invention to any single or multiple wellbore while Claim 15 is to multiple wellbores.

## VIII. ARGUMENTS

### ISSUE 1: Whether the Examiner has established that Claims 14 and 15 are indefinite under 35 U.S.C. §112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Examiner has rejected Claims 14 and 15 under 35 U.S.C. §112, second paragraph. The Examiner, at paragraph 3 of the OFFICE ACTION, states "the preamble of Claim 14 is inconsistent with that of the preamble of its parent Claim 1, in that Claim 1 pertains to a single wellbore whereas Claim 14 appears to pertain to a plurality of wellbores, rendering the claim indefinite."

The preamble of Claim 1 reads: "A system for monitoring and controlling a supply of an additive introduced into formation fluid within a production wellbore" and the preamble to Claim 14 reads: "The system of Claim 1 for monitoring and controlling the supply of additives to a plurality of production wells." It is not clear why the Examiner is rejecting Claim 14. One interpretation of his rejection is that a claim pending from Claim 1, which is the use of the system of the present invention with a single wellbore, cannot be the application of that system to multiple wellbores. Or stated another way, perhaps it is his position that Claim 14 is not narrower than Claim 1.

If this is the case, then the rejection is improper because Claim 14 is clearly narrower than Claim 1. For example, Claim 1 covers a system that monitors and controls additives within **a production wellbore**. Note that the indefinite article "a" was used rather than a specific number, such as "one". Therefore, an application of the invention

wherein the system is used with one wellbore, two wellbores, and so on would be within the scope of Claim 1. In contrast, an application of the invention must be, at a minimum, used with at least two wellbores to be within the scope of Claim 14. This is clearly within the infringement test of MPEP 608.01(n): "The test as to whether a claim is a proper dependent claim is that it shall include every limitation of the claim from which it depends (35 U.S.C. 112, fourth paragraph) or in other words that it shall not conceivably be infringed by anything which would not also infringe the basic claim." If follows that Claim 14 is narrower in scope than Claim 1 and is a proper dependent claim.

Another interpretation of the Examiner's rejection is he is objecting to the Appellants' use of the preamble to define a further limitation of the claim. This is an acceptable practice:

> However, the preamble may be limiting "when the claim drafter chooses to use both the preamble and the body to define the subject matter of the claimed invention."

Allen Engineering Corp. v. Bartell Industries, Inc., 63 USPQ2d ____ (Fed. Cir. 2002) *Citing,* Bell Communications Research, Inc. v. Vitalink Communications Corp., 34 USPQ2d 1816, 1820 (Fed. Cir. 1995).

It is assumed that Claim 15 is rejected for being dependent for pending from the Claim 14 and is otherwise allowable under 35 U.S.C. §112, second paragraph. The Appellants have demonstrated that Claims 14 and 15 are allowable and request reversal of the Examiner's rejection.

## BRIEF SUMMARIES OF THE REFERENCES

**1. SPIVEY (U.S. Pat. No. 4,635,723**

SPIVEY relates to a method of and apparatus for continuously injecting corrosion inhibitors at an oil and gas well. SPIVEY teaches using a portable skid that has a chemical tank, water tank, pumps, conduits, and controls mounted on it, and is transported to the production well site. In the SPIVEY method, a mix of corrosion-inhibiting chemical and water is supplied from the tanks to an end conduit, and the end conduit is connected to an injection string, or an annulus associated with a side mandrel,

of the production well. A computer control is provided for controlling the pumps, and other components, so that any desired amounts and proportions of a mix of chemical and water is continuously injected into the well to inhibit corrosion of the well production tubing string without interruption of production.

SPIVEY does not teach the elements of a second controller and a system for treating a plurality of well bores. In addition, the SPIVEY invention lacks a positive displacement flow meter such as is required in Claim 4 of the present application.

**2. MERRITT (U.S. Pat. No. 4,721,158 to Merritt, Jr. et al.)**

MERRITT relates to fluid injection control system. The control system disclosed includes a remote terminal controlling the injection of fluid into a plurality of spaced wellbores wherein, for each wellbore, high/low fluid flow rate limits and high/low fluid pressure limits are determined, and the flow rates into the wellbores are controlled within the pressure and flow ranges by commands from the remote terminal.

The MERRITT reference is limited to the field of providing "artificial lift" to subterranean formations that have ceased production under their pressure. In providing artificial lift, fluids or gas is injected in very large quantities flooding the reservoir and lifting oil and gas to the surface. MERRITT does not teach injecting additives into formation fluids.

**3. HENSLEY (U.S. Patent No. 4,354,553 to Hensley)**

HENSLEY relates to a well treatment method and apparatus for chemically inhibiting downhole production equipment with corrosion inhibitors. In the HENSLEY method, water is separated from the produced well fluid, and the flow rate and corrosive properties of the separated water is measured. Inhibitor solution is then injected into the stream of water in an amount that is proportional to the corrosive measurement of the water. The inhibitor and the water are intimately mixed, and the mixture is flowed into the casing annulus.

The Examiner offers this case for the limited purpose of showing dosage rates for corrosion inhibitors. This reference also lacks many elements of the present invention, including a second controller, treatment of a plurality of wells, and the like.

**4. TUBEL (U.S. Patent No. 6,006,832 to Tubel, et al.)**

The TUBEL reference is to a system and method for monitoring a formation surrounding a borehole in a production well using a downhole sensor permanently mounted in the well to sense at least one downhole formation parameter which is not normally present within the wellbore. Also disclosed in TUBEL is a formation evaluation sensor permanently located downhole in a production well having at least two boreholes, wherein at least one of the boreholes is a branch borehole, the sensor sensing a formation parameter which is not normally present within the borehole.

The Examiner cites TUBEL for the limited purpose of showing that it is known in the art to employ a host computer that is adapted to communicate with a plurality of computers over a network for the purpose of controlling wells located over a plurality of platforms.

**5. HAYATDAVOUDI (U.S. Patent No. 4,665,981 to Hayatdavoudi)**

The HAYATDAVOUDI reference discloses a method and apparatus for inhibiting corrosion of well tubing. In HAYATDAVOUDI, a corrosion monitor detects the concentration of a corrosive element in fluid produced from well tubing and a corrosion inhibitor is injected into the tubing by a pump at the depth at which water vapor condenses. A computer is programmed with a formula that generates an optimum concentration of corrosion inhibitor for a given concentration of the corrosive element. The computer is operatively connected to the monitor and receives data therefrom to generate a signal that is used to control the pump speed.

The Examiner cites **HAYATDAVOUDI** for the purpose of showing that it is known in the art to employ a sensor (38) for the purpose of monitoring the

corroding property of the formation fluid and the measured characteristic is used to alter the supply of the additive from the reservoir (56).

**6. PEARSON (U.S. Patent No. 4,901,563 to Pearson)**

PEARSON discloses a system for monitoring fluids during well stimulation processes. The Examiner cites PEARSON for the limited purpose of showing that it was known to have redundant flow control devices that are controlled by an onsite controller.

**7. JOHNSON (PCT Publication No. WO 98/57030 to Johnson, et al.)**

JOHNSON discloses the use of a control and monitoring system for chemical treatment of an oilfield well using one or more sensors placed downhole. The Examiner cites JOHNSON for the limited purpose of showing that that it is known in the art to employ injection of an additive at predetermined depths for the purpose of achieving desired properties of the formation fluid.

## ISSUE 2: Whether the Examiner has established a case of *prima facie* obviousness under 35 U.S.C. §103(a) of Claims 1, 2, 4 - 8, 10, 14, and 16 – 18 over SPIVEY in view of MERRITT and further in view of HENSLEY.

In paragraph 6 of the OFFICE ACTION, the Examiner states that SPIVEY discloses a system for a controlled injection of corrosion inhibiting additive to a production well (60), the system comprising a source of additive (13), a pump (30), a flow meter (35, 39) that generates appropriate signals via transmitters (36, 40) to a microprocessor based first controller (53) that controls a solenoid operated valve (46) to ensure a desired amount of additive to be injected into the well (60). The Examiner further notes that the controller (53) needs to be programmed (Col. 4, lines 51 - 55) which presumably involves an operator and thus via suitable programming the system is inherently capable of being manually overridden with previously programmed values.

It is the Examiner's position that SPIVEY discloses the claimed invention with the exception of (a) having a second controller that remotely controls the first controller

to deliver a desired amount of additive into the well and (b) the system controlling a plurality of well bores.

The Examiner cites MERRITT as disclosing a control system wherein a remote controller (40) controls a first controller (35) to deliver a desired amount of additive into a well. The Examiner further states that MERRITT discloses that it is known in the art to set the flow rate of the additive to be within a predetermined range and to adjust the flow rate if the measured flow rates fall outside of the set range (Col. 4, lines 35 - 56) and that MERRITT discloses details of controlling a plurality of well bores.

It is the Examiner's position that it would have been obvious at the time the invention was made to one of ordinary skill in the art to (a) have added a second controller at a remote location to the system of SPIVEY to be able to control the first controller from a remote location to deliver a desired amount of additive into the well, and (b) adapt the flow control/delivery system to work with a plurality of wells as recognized by MERRITT.

It is also the Examiner's position that the turbine flow meter disclosed by MERRITT is considered to be a positive displacement flow meter and the onsite controller (35) has associated with it, a database management system comprising computer programs and historical performance data (col. 4 in MERRITT) that could be easily shared with the second controller (40). The Examiner states that the limitation of the database management system being associated with the second controller as recited in Claim 8 is merely a design choice over those features disclosed in the combination of SPIVEY and MERRITT that provides no new and / or unexpected results nor solves any stated problem.

The Examiner states that the system according to the SPIVEY – MERRITT combination as set forth above discloses the claimed limitations with the exception of supplying the additive such that its concentration in the formation fluid is within the range of 1 ppm to about 10,000 ppm. It is the Examiner's position that HENSLEY

discloses that it is known in the art (see Col. 5, example 1) to use additives that result in an additive concentration in the formation fluid of about 230 ppm (which is well within the range claimed) to achieve desired corrosion inhibition and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to supply the additive such that its concentration in the formation fluid is within the range of 1 ppm to about 10,000 ppm for the purpose of achieving desired corrosion inhibition. The Examiner further alleges that the SPIVEY – MERRITT - HENSLEY combination as set forth above is capable of performing the method recited in Claims 16 - 18.

## STANDARDS FOR AN OBVIOUSNESS REJECTION

The standards for rejecting a claim as obvious are clear:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

35 U.S.C. §103(a). In putting the statutory language to practice, the MPEP states:

> To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure.

MPEP §706.02(j) Contents of a 35 U.S.C. 103 Rejection, (citing) In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The Federal Circuit uses the Graham factors:

> In order to determine obviousness as a legal matter, four factual inquiries must be made concerning: 1) the scope and content of the prior art; 2) the level of ordinary skill in the art; 3) the differences between the claimed invention and the prior art; and 4) secondary considerations of nonobviousness, which in case law is often said to include

> commercial success, long-felt but unresolved need, failure of others, copying, and unexpected results.

Ruiz v. A. B. Chance Co., 57 USPQ2d 1161, 1165 (Fed. Cir. 2000) *citing* Graham v. John Deere Co., 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966); Miles Labs., Inc. v. Shandon, Inc., 997 F.2d 870, 877, 27 USPQ2d 1123, 1128 (Fed. Cir. 1993).

**The combination of MERRITT with SPIVEY is improper for rejecting Claims 1, 2, 4 - 8, 10, 14, and 16 – 18 under 35 U.S.C. §103(a).** SPIVEY represents the prior art over which the present invention represents a significant improvement. The system of the present invention is a system that can be remotely programmed to insure that additives are pumped into produced oil at the correct rates without having a technician on-site. The present invention is useful, even in the event of situations such as partial shut-ins, reduced production rates, increased production rates, well contamination, equipment breakdown, and the like. The system of SPIVEY would lack the flexibility to operate unassisted in many if not all of these circumstances. In such circumstance, a technician capable of operating the SPIVEY system would need to be on-site to adjust the controller. In marked contrast, the present invention can be controlled from a remote location wherein the change in conditions can be either noted automatically or a remote technician can be contacted to adjust the system of the present invention with no need for a technician on-site. The lack of remote access in SPIVEY is significant in its inability to perform the function of controlling the addition of additives without excessive on-site time by technicians.

This defect in SPIVEY is particularly important in marginal wells where the value of the production is close to the cost of running the well. A system such as that disclosed in SPIVEY which is not economical in regard to managing the costs associated with adding additives could easily cause such a well to be shut down and cemented whereas the system of the present invention could be used to maintain the production of scarce resources that would otherwise be left in the ground.

The present invention, especially as set forth in Claim 4 is, clearly superior to the system disclosed in SPIVEY. In circumstances where production flow rates must be

drastically lowered, the SPIVEY system's orifice flow meters lack the flexibility to measure very low flows that would be required to avoid over or under feeding additives. Ironically, in instances where production flow rates must be drastically raised, the SPIVEY system might also be unusable, at least in situations where the additives are injected down hole. The reason for this is that higher production rates might also be associated with higher production pressures reducing the pressure differential across the SPIVEY orifice. This weakness in SPIVEY is reinforced at Column 4, lines 8-14, where SPIVEY states that a sensor (50) is used to insure that oil does not backup through the feed tube. If the SPIVEY flow meters were functional in broad ranges, particularly in low flow, no flow and especially reverse flow situations, then such devices would not be needed.

The system of the present invention also has the flexibility to be easily used with a broad range of materials. The positive displacement flow meters used with the present invention measure flow by volume. Calculating flow using an orifice requires that the specific density of the material be accurately known. SPIVEY is designed to work with on-site water for dilution, but the density of on-site water can vary dramatically. For example, in oil field operations, on-site water can vary from fresh surface water to fresh ground water to surface seawater to subsurface brine and even to potable water. The specific density of each of these could vary substantially as well as include constituents that could interact with at least some additives that could be used in such a system to have additional impacts upon the accuracy of the flow measurements of the SPIVEY flow meters. In order for SPIVEY to be used with a variety of materials, a technician would need to be on hand to determine specific density of the additive as used. This defeats one of the advantages of the present invention **... reduced technician time on-site**.

The present invention can function to reduce technician time in other ways as well. With a reliable means of measuring additive flows, the present invention can detect when a pump fails in a manner other than that which would be an detectable event with SPIVEY. Such failures could include, seal blowouts, mechanical failures, flow feed blockages, overpressure from the formation, etc. With the present invention, a redundant

pump, such as that which is claimed in Claim 13, can be activated and the device scheduled for routine repair. If a similar failure occurred with a device such as SPIVEY, then the problem would go unresolved until the next visit by a technician. If that technician was not trained to resolve the problem, then the well would have to be operated without additives or shut down, neither option being a desirable one. If the site were really remote, such as an unmanned offshore platform, the cost of renting a helicopter could be very high.

The Examiner cites MERRITT for purposes of combining MERRITT and SPIVEY to overcome the shortcomings of SPIVEY. The Examiner has noted the elements in common between MERRITT and the present invention. But the differences between MERRITT and the present invention are far more significant than the elements in common. It is clear that MERRITT is not directed to the field of the present invention at all, the addition to production fluid of additives as it is produced, but rather MERRITT is directed to water flooding and possibly polymer flooding, forms of secondary and tertiary recovery respectively. Waterflooding or waterflood is defined by the Railroad Commission of Texas on their website at:

http://www.rrc.state.tx.us/divisions/og/glossary.html

as: "Waterflood - Injecting water in one well causing oil not recovered by primary production to migrate to an adjacent well." Evidence that MERRITT is directed only to such flooding can be found as follows.

In MERRITT, at the paragraph bridging Columns 2 and 3, the pressure of fluid being injected is measured. This has no relevance to additive injection, the field of the present invention, and important relevance to field flooding. In the injection of a drive fluid, care must be taken to not damage the injection well with too high pressure. (MERRITT, Column 1, lines 30-37). In the injection of an additive, the additive is not injected into the formation, but rather into oil and gas being produced. Stated another way, in water flooding, a comparatively large quantity of drive fluid is injected into an oil bearing formation, by means of one or more injection wells, to drive the remaining oil to a producing well to be recovered. In marked contrast, in the practice of the present

invention, a comparatively small amount of additive is injected into a production stream as it leaves the formation and enters the wellbore to, for example, protect against paraffins, scaling and the like.

In the present application, the claims are clearly limited to systems for injection of additives into a production fluid being produced from a wellbore. As amended, each of the independent claims, Claims 1 and 16, has a limitation to a source of additives and the additives are limited to a specific and low concentration, from 1 to 10,000 ppm (0.0001 to 1%). Additives are defined in the first paragraph of the Background of the present Application to be chemicals injected from a surface source into wells to treat the formation fluid being produced and flowing through such wells. In MERRITT, there is no production, only injection of large quantities of a drive fluid into an injection well and then into a producing formation. (See, Column 1, lines 24-26). The flow rates associated with waterflooding are huge. For example, in the paper, Formation Damage in Iranian Oil Fields, SPE 73781, it is disclosed at page 2 that the water flooding injection rate for the subject field was from 2200 bbl/day to 9100 bbl/day (92,400 to 382,200 gallons/day). This is dramatically greater than the present invention wherein injection rates of additives are into the formation fluid as it is exiting the formation and are no greater than 1% of the flow rate of the well.

The problems being solved in MERRITT and those solved by the present invention are quite different. In MERRITT, the object of the invention is to get as much water flooding into a reservoir with the least expenditure of resources, for example not crushing the porous zone in the injection well which would then increase the time and energy necessary to get the same volume of water into the formation. The system of the present invention delivers a measured amount of additives into oil being produced from a production well, reducing or stopping the flow of additives when production stops or nearly stops, and maintaining treatment at high levels during periods of high production, all with the least possible on-site (and expensive) technician intervention.

The foregoing discussion shows that the system of the MERRITT reference and the system of the present invention are very different in application, solving very different problems. As such it would be improper to combine SPIVEY with MERRITT.

> When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness.

In re Lee, 61 USPQ2d 1430,1433 (Fed. Cir. 2002), *citing* McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001) ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the Graham factors).

> Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.

In re Dembiczak, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). One of ordinary skill in the art, faced with solving the problems of delivering a comparatively tiny amount of an additive into an oil and gas production well to treat production fluid on its way out of the well would not have been motivated to consider the MERRITT teachings at all, much less combine the SPIVEY reference with MERRITT, which teaches water injection for water flooding, because the tasks are too different to give any assurance of success in solving the problem. The combination of SPIVEY with MERRITT is the exactly the kind hindsight reconstruction cautioned against by the court in In re Dembiczak.

In regard to Claim 4 of the present invention, the MERRITT reference does not even suggest the replacement of the SPIVEY orifice flow meter with positive displacement flow meters. To the contrary, to the extent that it applies at all, the MERRITT reference teaches away from the reliance on flow meters such as that of Claim 4 of the present Application. In MERRITT, the system is measuring very high flows and teaches combining a flow meter with a pressure transducer. This is due to the problem that is solved by the MERRITT reference, not damaging the permeable zones of the formation being water flooded. *See*, MERRITT, column 1 lines 29-37 and column 2,

lines 16-18. MERRITT's reliance on a pressure transducer would not motivate one of ordinary skill in the art to use a positive displacement flow meter when MERRITT actually teaches that pressure and flow rate must both be monitored in order to protect the injection well.

> The reason, suggestion, or motivation to combine [references to find obviousness] may be found explicitly or implicitly: 1) in the prior art references themselves; 2) in the knowledge of those of ordinary skill in the art that certain references, or disclosures in those references, are of special interest or importance in the field; or 3) from the nature of the problem to be solved, "leading inventors to look to references relating to possible solutions to that problem."

Ruiz v. A. B. Chance Co., 57 USPQ2d 1161, 1167 (Fed. Cir. 2000) (internal references omitted). The two references, SPIVEY and MERRITT do not have any suggestion within them to make this combination. There is nothing in either SPIVEY or MERRITT to indicate that they are of special interest or importance in their respective fields of art. Nothing in the nature of the problems to be solved in the present application would motivate one of ordinary skill in the art in adding additives to oil being produced to look to MERRITT. And in regard to the last element of the test, one of ordinary skill in the art would not look to a reference which teaches water flooding an entire formation for secondary and tertiary recovery to solve a problem with injecting small amounts of additives into formation fluid as it exits the formation and enters the wellbore to prevent corrosion, scaling and the like in routine production.

The Examiner cites HENSLEY to show that it is known in the art to use additives that result in an additive concentration in the formation fluid of about 230 ppm (which is well within the range claimed) to achieve desired corrosion inhibition and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to supply the additive such that its concentration in the formation fluid is within the range of 1 ppm to about 10,000 ppm for the purpose of achieving desired corrosion inhibition. The Appellants acknowledge that that information was known at the time of the present invention, but the purpose of the concentration limitation in Claims 1 and 16 was to clearly distinguish the present invention from MERRITT. HENSLEY is otherwise very

different from the present invention, teaching that it is necessary to separate the production of the well into an aqueous and non-aqueous portion and then do a test upon the aqueous portion of the production stream in order to determine a proper dosage of corrosion inhibitors. This is completely contrary to the method of the present invention and this reference would not have been useful to one attempting to solve the problems solved by the present invention.

There is additional evidence available to show that Claims 1, 2, 4-8, 10, 14, and 16-18 of present application are not obvious over SPIVEY in view of MERRITT and HENSLEY. The assignee has had significant financial success in the sale of systems as claimed in the present application [as shown by the declaration in APPENDIX III]. Financial success, a secondary indicia of non-obviousness, can be important in determining the patentability of an invention. The Federal Circuit has stated that "Appreciation by contemporaries skilled in the field of the invention is a useful indicator of whether the invention would have been obvious to such persons at the time it was made. Vulcan Engineering Co. v. FATA Aluminum Inc., 61 USPQ2d 1545, 1548 (Fed Cir. 2002) *citing* Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 1538, 218 USPQ 871, 879 (Fed. Cir. 1983) ("evidence of secondary considerations may often be the most probative and cogent evidence in the record") and Demaco Corp. v. F. Von Langsdorff Licensing Ltd., 851 F.2d 1387,1391, 7 USPQ2d 1222, 1225 (Fed. Cir. 1988) ("The commercial response to an invention is significant to determinations of obviousness, and is entitled to fair weight."). The financial success of the present invention is even more significant in view of the fact that the SPIVEY patent was allowed to expire due to non-payment of the maintenance fees. This basis for patentability was offered to the Examiner in the Response dated March 11, 2002, at page 12, but not addressed by the Examiner in the final rejection. The Appellants respectfully request that the commercial success of the present invention be also considered by the Board of Appeals.

Claims 1, 2, 4-8, 10, 14, and 16-18 of the present application are also not obvious over the art cited by the Examiner for an additional reason that relates to the nature of the invention. Some of the elements the claims of the present application may seem like only

minor advances, such as the positive displacement flow meter of Claim 4, but that is not a basis for finding the claims of the present application obvious. In Intel Corp v. International Trade Commission, 20 USPQ2d 1161 (Fed Cir. 1991), the Federal circuit holds a claim as unobvious, stating (at 1173), in a case regarding a UPROM, that "[w]hile the extension of the sidewalls may seem like only a minor advance, it was not an obvious one." In the larger sense, the Appellants have found a way to take a known technology, treating formation fluid with additives, and apply it in a way that solves many of the problems with this technology, namely the cost of wasted additives, the costs of overfeeding or underfeeding additives, and the costs of providing technicians for on-site visits to oil and gas production-sites. In Intel, the Federal Circuit also states that "failure of others to provide a feasible solution to a longstanding problem is probative of non-obviousness." Id. At 1173.

The combination of art cited in the rejection of ISSUE 2, SPIVEY – MERRITT – HENSLEY is further cited in the remaining rejections. The Appellants' objection to this combination is maintained for the following arguments regarding ISSUES 3-6. In the interest of avoiding prolixity, the Appellants respectfully request the Board of Appeals to accept this citation of the arguments above as an acceptable substitute for repetition of those arguments in each of the subsequent sections of this brief.

## ISSUE 3: Whether the Examiner has established a case of *prima facie* obviousness under 35 U.S.C. §103(a) of Claim 9 over the SPIVEY - MERRITT - HENSLEY combination as applied to Claims 1, 2, 4 - 8, 10, 14, and 16 - 18, and further in view of TUBEL.

It is the position of the Examiner that the system according the combination of SPIVEY, MERRITT, and HENSLEY, discloses all the claimed features of Claim 9 with the exception of having the second remote controller being adapted to communicate with a plurality of computers over a network. The Examiner states that TUBEL discloses (Fig. 4) that it is known in the art to employ a host computer (10, Fig. 4) that is adapted to communicate with a plurality of computers over a network for the purpose of controlling wells located over a plurality of platforms. He further states that it would have been

obvious at the time the invention was made to a person having ordinary skill in the art to employ in the system according to SPIVEY, MERRITT, and HENSLEY the combination of a host computer that is adapted to communicate with a plurality of computers over a network for the purpose of controlling wells located over a plurality of platforms.

It is the Appellants' position that Claim 9 of the present application is not obvious over SPIVEY, MERRITT, and HENSLEY in further view of TUBEL. The problems being solved in TUBEL are very different from the problems resolved by the present invention. In TUBEL, the problem solved was controlling downhole tools using downhole sensors to monitor formation measurements. The downhole sensors referenced:

> include, but are not limited to, sensors for sensing pressure, flow, temperature, oil/water content, geological formation, gamma ray detectors and formation evaluation sensors which utilize acoustic, nuclear, resistivity and electromagnetic technology.

TUBEL at Column 11, lines 28-32.

The TUBEL systems are very complex and the costs associated with the use of this system are enormous. At TUBEL, Column 2, lines 18-36, the problem to which TUBEL is a solution is the need to send a rig to an offshore well resulting in five million dollars in costs and forty five million dollars in lost production. This is a very complex system and functions for a very different purpose from the object of the present invention, the efficient and cost effective supply of additives to formation fluid as it is being produced from a production wellbore. While it is not impossible that a device embodying the present invention could be implemented in such an application, it is at least as likely that the present invention would be implemented in small or at least marginal oil field where the cost of the additives used to treat the production fluid as it is recovered from the formation can make the difference in whether or not it is economically feasible to maintain operation of the oil field. One of ordinary skill in the art would not have been motivated to make this four reference combination and such a combination is merely a hindsight reconstruction of the present invention.

Additionally, the APPELLANTS object to the use of TUBEL as prior art. TUBEL is owned by a common entity, Bakers Hughes Incorporated, and was co-pending with the priority documents claimed by the present application. TUBEL published on December 28, 1999. The present application is a continuation in part of Patent Application Ser. No. 60/153,175 filed on September 10, 1999 and Patent Application Ser. No. 09/218,067 filed on December 21, 1998. It is the Appellants' belief that the concept for which TUBEL was cited against the present Application was present in the cases copending with the present application, at page 12, lines 1-4 of the 09/218,067 application wherein it is disclosed that information could be transmitted by means of any suitable two way data link.

## ISSUE 4: Whether the Examiner has established a case of prima facie obviousness under 35 U.S.C. §103(a) of Claims 11, 12, 19 and 20 over the SPIVEY - MERRITT - HENSLEY combination as applied to Claims 1, 2, 4 - 8, 10, 14, and 16 - 18, and further in view of HAYATDAVOUDI.

It is the Examiner's position that the system according the combination of SPIVEY - MERRITT - HENSLEY discloses all the claimed features of Claims 11, 12, 19 and 20 with the exception of having a sensor measuring a characteristic of the formation fluid and altering the supply of a selected additive in response to the measured characteristic. He further states that HAYATDAVOUDI discloses that it is known in the art to employ a sensor (38) for the purpose of monitoring the corroding property of the formation fluid and the measured characteristic is used to alter the supply of the additive from the reservoir (56) and that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in the SPIVEY - MERRITT - HENSLEY system a sensor for measuring a characteristic of the formation fluid and altering the supply of a selected additive in response to the measured characteristic for the purpose of selectively controlling the injection of the additive. The Examiner further adds that this combination is capable of performing the method recited in Claims 19 and 20.

It is the Appellants' position that Claims 11, 12, 19, and 20 of the present application are not obvious over the SPIVEY - MERRITT - HENSLEY combination in further view of HAYATDAVOUDI. HAYATDAVOUDI is directed toward a single additive while the present invention is directed at a much broader range of additives, including sulfites, hydrogen sulfide, paraffin, emulsion, scale, asphaltenes, and hydrates. HAYATDAVOUDI also lacks the elements necessary to be practical. There is no flow meter that can be used to confirm the correct functioning of the system. It cannot be remotely programmed. Use of the system of HAYATDAVOUDI would result in either wasted additives or under feeding additives when the system failed and no checking of flow rates takes place. The combination of HAYATDAVOUDI and the SPIVEY - MERRITT - HENSLEY combination in regard to the present invention is a hindsight combination and does not properly render Claims 11, 12, 19, and 20 of the present application obvious.

**ISSUE 5: Whether the Examiner has established a case of prima facie obviousness under 35 U.S.C. §103(a) of Claim 13 over the SPIVEY - MERRITT - HENSLEY combination as applied to Claims 1, 2, 4 - 8, 10, 14, and 16 - 18, and further in view of PEARSON.**

It is the Examiner's position that the system according the combination of SPIVEY - MERRITT - HENSLEY discloses all the claimed elements of Claim 13 with the exception of having redundant flow control devices that are controlled by an onsite controller. The Examiner states that PEARSON discloses that it is known in the art to employ redundant flow control devices (36) controlled by an onsite controller (54) for the purpose of obtaining assured supply of additive into the well. He further states that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in the system according to the SPIVEY - MERRITT - HENSLEY combination redundant flow control devices for the purpose of obtaining assured supply of the additive into the well as recognized by PEARSON.

It is the Appellants' position that Claim 13 of the present application is not obvious over the SPIVEY – MERRITT - HENSLEY combination in further view of PEARSON. PEARSON is directed toward well stimulation processes. These processes

include hydraulic fracturing. Hydraulic fracturing is even more remote from the method of the present invention than is the waterflooding of MERRITT. The pumps cited by the Examiner are not necessarily redundant but rather are more likely needed to achieve the flow volumes and pressures necessary for hydraulic fracturing. At PEARSON, Column 3, lines 21-23, it is disclosed that the flow rates for hydraulic fracturing may exceed 4,200 gallons per minute (252,000 gallons per hour). Particularly on a portable apparatus such as that pictured in the patent, it would take more than one pump on the manifold to achieve such a high flow rate. This is very different from the present invention wherein the redundant pumps are used to extend the periods between service calls at remote well sites.

Rather than functioning to increase the rate flow, the redundant flow control devices of Claim 13 function to assure a continued flow of additives in the event of an equipment failure. As already argued in ISSUE 2 above, the ability to switch from a malfunctioning flow controller to a redundant flow controller allows for the non-emergency repair of the system and prevents a prolonged period of underfeeding additives to a well or having to suspend operation of the well. This is an important means of decreasing the cost of supplying additives into a production wellbore.

One of ordinary skill in the art would not have been motivated to make the combination of PEARSON with the SPIVEY – MERRITT – HENSLEY references to achieve the highly reliable system claimed in Claim 13 to solve the problems solved with the present invention. This combination is another hindsight combination that is insufficient to render Claim 13 obvious.

**ISSUE 6: Whether the Examiner has established a case of prima facie obviousness under 35 U.S.C. §103(a) of Claims 3 and 15 over the SPIVEY - MERRITT - HENSLEY combination as applied to Claims 1, 2, 4 - 8, 10, 14, and 16 - 20, and further in view of JOHNSON.**

It is the Examiner's position that the system according the combination of SPIVEY - MERRITT - HENSLEY discloses all the claimed features of Claims 3 and 15

with the exception of having injection of additives at pre-determined depths. The Examiner states that JOHNSON discloses (Fig. 3) that it is known in the art to employ injection of additive at predetermined depths for the purpose of achieving desired properties of the formation fluid and it would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in the system according to the SPIVEY - MERRITT - HENSLEY combination, a means for injecting the additive at a predetermined depth for the purpose of achieving desired properties of the formation fluid. The Examiner further noted that JOHNSON discloses (Fig. 6) the injection of additives into a surface processing unit in addition to injection into the wellbore and that such surface treatment units provide further treatment of the produced fluid such as separation of water in emulsion from oil and gas, etc.

It is the Appellants' position that Claims 3 and 15 of the present application are not obvious over SPIVEY - MERRITT – HENSLEY in further view of JOHNSON. Claims 3 and 15 are not obvious due to the improper combination of SPIVEY, MERRITT and HENSLEY, established above.

## IX. PRAYER FOR RELIEF

It is respectfully submitted that the rejections of the claims have been overcome and/or avoided by the arguments presented above. It is further respectfully requested that the Board reverse the final rejections of the Examiner. The Examiner and/or the Board are encouraged to call the Appellants' attorney at the number below for any reason that may advance prosecution of the case.

Respectfully submitted,

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